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Final

Meeting Minutes Transmittal/Approval
Unit Manager's Meeting: 200 Aggregate Area/200 Area Operable Units
2440 Stevens Center Place, Room 1200, Richland, Washington
January 19, 1995

FROM/APPROVAL: Donna Wanek Date 3/30/95
Donna Wanek, 200 Aggregate Area Unit Manager, RL (H4-83)

APPROVAL: Paul R. Beaver Date 4/3/95
Paul R. Beaver, 200 Aggregate Area Unit Manager, EPA (B5-01)

APPROVAL: Dib Goswami Date 4/6/95
Dib Goswami, 200 Aggregate Area Unit Manager, WA Dept of Ecology

Meeting Minutes are attached. Minutes are comprised of the following:

- | | | |
|----------------|---|--|
| Attachment #1 | - | Meeting Summary |
| Attachment #2 | - | Attendance Sheet |
| Attachment #3 | - | Agenda |
| Attachment #4 | - | Action Item Status List |
| Attachment #5 | - | Project Status of 200-BP-5 Groundwater Operable Unit |
| Attachment #6 | - | Project Status of 200-UP-1 Groundwater Operable Unit |
| Attachment #7 | - | Project Status of 200 West Carbon Tetrachloride ERA |
| Attachment #8 | - | 200-ZP-1/200-ZP-2 Operable Unit NPL Agreement Form BHI-00267 |
| Attachment #9 | - | 200-BP-5 Operable Unit NPL Agreement Form BHI-00160 |
| Attachment #10 | - | Project Status of 200-ZP-1 Operable Unit |
-

Prepared by: Jim Consort Date: 27 March 1995
Jim Consort, Kay Kimmel, GSSC (B1-42)

Concurrence by: Joseph Zoghbi Date: 4/2/95
Joseph Zoghbi, BHI Project Manager - 200 Areas, (H6-07)



Attachment #1
Unit Manager's Meeting: 200 Aggregate Area/200 Area Operable Units
 January 19, 1995

Meeting and Summary of Commitments and Agreements

1. SIGNING OF THE PREVIOUS 200 AREA UNIT MANAGER'S MEETING MINUTES:
 Meeting minutes were not available.

2. ACTION ITEM UPDATE. See Attachment 4 for status:

2AAMS.13	Open.	Pending formal transmittal of the groundwater model study.
2AAMS.16	Open.	
2BP5.1	Open.	
2UP1.2	Open.	
2BP5.2	Open.	
2UP1.3	Open.	
2ZP1.1	Closed.	

3. NEW ACTION ITEMS (INITIATED January 19, 1995):

2AAMS.19	Issue the outstanding 200 Areas UMM minutes for signature. Action: Donna Wanek.
2UP1.4	Provide rationale from management on why documents cannot be sent to the USGS. This issue to be dealt with on the PM level and tracked at UM level.
2ZP2.1	EPA and Ecology require that RL submit within 10 days a draft change package to establish milestones for the 200-ZP-2 vapor extraction system, or transmit the proposed plan. Action: Bryan Foley and Jennifer Young.

4. INFORMATION ITEMS:

- Status 200-BP-5 Operable Unit - Dave Erb provided the status of BP-5 activities (Attachment #5).

216-BY and 216-B-5 Reverse Well Treatability Tests: No significant change of plume definitions observed. Ecology requested copy of letter report by Dave Myers that discusses time required to remediate groundwater to acceptable levels (Ms. D. Wanek will provide report) and they would also like more information on zeolites. EPA was concerned that the winterization of the system was not completed until 13 January 1995. Treatability Test Report will be submitted to RL for review by 31 January 1995 and the IRM Proposed Plan will be ahead of schedule and out before the Milestone date.
- Status 200-UP-1 Operable Unit - Curt Wittreich provided status (Attachment #6). EPA would like the 200-UP-1 Proposed Plan to be consistent with the format of the 200-ZP-1 Proposed Plan. The Bionitrification Test Report is being drafted.

- Status 200-ZP-2 Operable Unit, ERA Activity - Sean Driggers provided the update (see Attachment #7). ERA Vapor Extraction System is running around the clock. Granular Activated Carbon canisters can be loaded with 300 to 1000 pounds of carbon tetrachloride. NPL form was signed (form BHI-00267) regarding the transfer and treatment of condensate by the 200-ZP-1 Treatability Test System (Attachment #8).

The NPL form BHI-00160 was made available - Treatability Study of the Tunable Hybrid Waste Control Plan (Attachment #9).

- Status of 200-ZP-1 - Jhivaun Freeman-Pollard gave status (Attachment #10). The bioremediation technology from the Arid VOC in 200 West near T Plant will be done by PNL to degrade carbon tetrachloride *in situ*. Baseline phase will proceed on 1 February 1995 (no injection of nutrients) to conduct measurements; is funded by EM-50. Baseline phase will last two months. Integrated Test Plan Report from BHI given to RL and forwarded to the regulators (PNL helped issue document).

200-ZP-1 Pilot Scale Treatability Test: Pilot Scale Treatability Test Report scheduled to be submitted to RL by April 19. Restarted test on 17 January 1995.

**200 Aggregate Area Unit Manager's Meeting
Official Attendance Record
January 19, 1995**

Please print clearly and use black ink

PRINTED NAME	ORGANIZATION	O.U. ROLE	MSIN	TELEPHONE
M.A. Buckmaster	BHI	Team Lead	H6-01	6-1792
J. Conant	Danvers Mtn/LSSC	RL Support	B1-42	9463694
B. L. Foley	DOE-RL	UMM	H4-83	3767087
G. FREEDMAN	Ecology	omm		736-3026
D. Sickle	BHI	Support	H4-79	(509)-375-9422
Dennis Faulk	EPA	umm	B5-01	509-376-8631
Dina Murphy	DOE-RL	EPA TPA	A5-15	373-7851
George C Hancock III	BHI	Source. UU TRAIL LEAD	H6-07	376-1994
Ro Vinson	BHI	Reg Spt	—	(303)688-2540
K R Porter	ITH	200 GW Task Lead	H6-01	376-4650
G. L. KASTA	ITH	200 BP-5 LEADER	H6-04	376-0763
W.E. Lum II	USGS	EPA Support		2065936510
KAY KIMMEL	MACTEC	RL SUPPORT	B1-42	5099463692
Donna Wane	RL	UMM	H4-83	376-5778
Michael Truev	PNL	Tech Demon	P7-41	372-1220
Keith Holliday	Ecology	On manager		736-3030
HASSAN EL-BIETAR	BHI	COORD. (TPA)	H4-79	373-9124
Saleem Faraghi	Danvers Mtn/LSSC	RL Sup.	K8-50	372-4023
MIKE BAKER	ITH	200-BP-5 ASST. LEAD	H6-04	373-6862
Dave Erb	ITH	200-BP-5 Lead	H6-01	372-1402
Sean Driggers	ITH	200-ZP-2 Lead	H6-01	372-3493

Attachment #3
Unit Manager's Meeting: 200 Aggregate Area/200 Area Operable Units
January 19, 1995

200 Area Activities

200-BP-5 - D. Erb

- * Action Item Status
- * General Status

200-UP-1 - Curtis Wittreich

- * Action Item Status
- * Characterization Program
- * Treatability Test Program

200-ZP-2 - Sean Driggers

- * Carbon Tetrachloride ERA

200-ZP-1 - D. Parker

- * Action Item Status
- * General Status

Attachment #4

Action Item Status List
Unit Manager's Meeting: 200 Aggregate Area/200 Area Operable Units
January 19, 1995

ITEM NO.	ACTION	STATUS
2AAMS.13	Transmit the 200-UP-1 and 200-ZP-1 Treatability Test Plans and Mike Connelly's groundwater modeling studies for pump and treat to the regulators. Action: Paul Pak.	Open 03/31/94.
2AAMS.19	Issue the outstanding 200 Areas UMM minutes for signature. Action: Donna Wanek	Opened 01/19/95.
2UP1.2	Develop a treatability test plan for denitrification of 200-UP-1 groundwater at laboratory and bench scales, based on the 100 Area Treatability Test Plan for Nitrate. Action: Paul Pak.	Open 05/26/94.
2UP1.3	Provide regulators with laboratory results on sample point WLS on October 14, 1994. Action: Bruce Ford.	Opened 09/28/94.
2UP1.4	Provide rationale from management on why documents cannot be sent to the USGS. This issue to be dealt with on the PM level and tracked at UM level.	Opened 01/19/95.
2BP5.1	Revise the existing Description of Work to include the use of the cone penetrometer prior to installation of new wells to better locate extraction and recovery wells. Action: David Erb.	Open 05/26/94.
2BP5.2	Provide date on streamlining the groundwater sampling effort. Action: Joe Zoghbi	Opened 09/28/94.
2ZP1.1	Provide to EPA (Paul Beaver) data on the Iron Filing Pilot Scale treatability test performed by Waterloo. Action: Donna Wanek.	Closed 01/19/95.
2ZP2.1	EPA and Ecology require that RL submit within 10 days a draft change package to establish milestones for the 200-ZP-2 vapor extraction system, or transmit the proposed plan. Action: Bryan Foley and Jennifer Young.	Opened 01/19/95.

UNIT MANAGERS MEETING

200-BP-5 OPERABLE UNIT

D. B. ERB

January 19, 1995

PL513 - CHARACTERIZATION

#5/Page 2 of 7

- * MOST OF PRELIMINARY RESULTS FROM LABORATORY HAS BEEN RECEIVED. NO SURPRISES BUT BY PLUME EXPANDED SLIGHTLY.
- * DATA VALIDATION INITIATED.

PL515 - TREATMENT**216-BY SYSTEM**

- * OCCURRENCE REPORT FOR Hg CONTAMINATION WAS CANCELED ON DECEMBER 13. ANALYSIS OF SAMPLES FROM NOV 16 SHOWED Hg BELOW DWS.**
- * TREATMENT SYSTEM WAS RESTARTED ON NOVEMBER 28 AND SHUT DOWN DEC 9 DUE TO HR-3 ACCIDENT.**
- * 8870 GALLONS EXTRACTED, 9000 GALLONS TREATED, AND 18,100 GALLONS REINJECTED IN 10 DAY PERIOD. FREEZING WEATHER HINDERED DAILY START-UPS AND PRODUCTION ACTIVITY.**
- * WINTERIZATION STARTED EARLY NOVEMBER AND COMPLETED JANUARY 13.**
- * SYSTEM RESTART ON JANUARY 18.**

PL515 - TREATMENT**216-B-5 REVERSE WELL SYSTEM**

- * SYSTEM RESTARTED ON NOVEMBER 28 & SHUT DOWN ON DEC 8 FOLLOWING HR-3 ACCIDENT.**
- * 18,000 GALLONS EXTRACTED, TREATED AND REINJECTED IN 9 DAYS. FREEZING WEATHER HINDERED DAILY SYSTEM STARTUP.**
- * TRACER TEST AT 299-E28-23 INITIATED WITH REINJECTION AT SYSTEM RESTART. RESULTS NOT CONCLUSIVE TO ALLOW CALCULATION OF TRAVEL TIMES BETWEEN WELLS.**
- * SYSTEM WINTERIZATION STARTED EARLY NOVEMBER AND COMPLETED JANUARY 13. RESTART OF SYSTEM APPROVED ON JANUARY 17.**
- * Hg-CONTAMINATED WATER IN TANK 9 WAS SHIPPED TO THE PURGEWATER FACILITY IN LATE DECEMBER, 1994.**
- * TANK 1 (OFF-LINE) CONTENTS DISPOSED TO GROUND DURING 4th WEEK OF JANUARY.**
- * MINI-COLUMN TEST PLAN UNDERGOING FINAL REVIEW & SYSTEM NEARLY FINISHED. RESTART WILL PROVIDE FILTERED TEST WATER.**

PL526 - REMEDIATION

#5/Page 5 of 7

GEOHYDROLOGIC CHARACTERIZATION**216-B-5 REVERSE WELL PLUME**

- * A 2nd TRACER TEST, USING LiBr DYE, AT 299-E28-25 WELL IS PLANNED AFTER RESTART OF SYSTEM. TEST WILL BE BASED ON 24 HOUR/DAY OPERATIONS.

216-BY CRIBS PLUME

- * REMEDIATION AT 699-55-57 WELL
 - SHOT PERFORATION OF CASING WAS CONDUCTED ON DECEMBER 29, 1994. OVERLARGE PERFORATIONS ALLOW RUNNING SAND INTO WELL.
 - 6" TELESCOPING WELL SCREEN TO BE INSTALLED ON 4TH WEEK OF JANUARY TO PROVIDE ADEQUATE PUMPING CAPABILITY FOR ADDITIONAL WELL TESTING.
 - AQUIFER PRODUCTIVITY TEST WITH CONCURRENT SAMPLING TO BE CONDUCTED IN LATE JANUARY/EARLY FEBRUARY.

PL526 - REMEDIATION**216-BY CRIBS PLUME**

- * SYSTEM RELOCATION ENGINEERING STUDY COMPLETED.**
- * SONIC PUSH (CRADA)**
 - USE AT BP-5 DELAYED UNTIL AFTER SUCCESSFUL COMPLETION OF TESTING AT DRILLING TEST YARD.**
 - 3 ADDITIONAL HOLES POSTPONED INDEFINITELY.**
- * GROUNDWATER SAMPLING AT WELLS 699-55-60A**
 - WELL 699-55-60A WILL BE SAMPLED FOR Tc-99, Co-60, CYANIDE, NITRATES, METALS AND ANIONS.**
 - SAMPLING TO BE CONDUCTED CURRENT WITH 699-55-57 ACTIVITIES.**

PL526 - REMEDIATION

#5/Page 7 of 7

- * QUARTERLY GWT ELEVATION MEASUREMENTS CONDUCTED IN LATE DECEMBER - RESULTS RECEIVED, NOT YET ANALYZED.
- * GROUNDWATER VELOCITY/DIRECTION MEASUREMENTS ON HOLD - EQUIPMENT AVAILABILITY AND CALIBRATION ISSUES.
- * D. MYERS LETTER REPORT INDICATES THAT AT LEAST 1250 YEARS WOULD BE NEEDED TO REMOVE ALL Pu-239/240 FROM B-5 PLUME AND THAT 22 YEARS WOULD BE REQUIRED TO TREAT BY's Tc-99 PLUME.

**200-UP-1 GROUNDWATER OPERABLE UNIT
UNIT MANAGERS MEETING
JANUARY 19, 1995**

AGENDA

- CHARACTERIZATION
 - GROUNDWATER MONITORING STATUS
 - NPL Agreement Drafted
 - First Quarter FY95 Monitoring Wells Identified
 - WELL INSTALLATION STATUS
 - FY94 Borehole Summary Report Finalized
 - FY95 Description of Work Drafted under Ecology/EPA Review
 - Pre-Drilling Activities Ongoing
 - Procurement of Drilling Subcontractor Ongoing
 - PLUME MAPS
 - Uranium, Technetium and Nitrate Plume Maps Revised
 - Vertical Profiling Report Finalized

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AGENDA (Continued)

- **TREATABILITY TESTING**
 - **TREATABILITY TEST REPORT STATUS**
 - Drafted under DOE/Ecology/EPA Review
 - **PILOT-SCALE SYSTEM STATUS**
 - Restarted
 - Treated over 1,000,000 Gallons Groundwater
 - **LAB-SCALE TEST STATUS**
 - Bench-Scale Batch/Column Tests Completed
 - Bench-Scale Biotenitrification Test (Knoxville) Ongoing
- **IRM PROPOSED PLAN**
 - Preparation of Initial Draft Ongoing

January 19, 1995 Unit Managers Meeting
Project Status of the 200-ZP-2 Operable Unit

ERA STATUS

- Summary of 1994 Vapor Extraction Operations
 - 500 cfm system at the Z-18 site removed 3,290 lbs of CCl_4
 - 1000 cfm system at the Z-1A site removed 15,976 lbs of CCl_4
 - 1500 cfm system at the Z-9 site removed 77,065 lbs of CCl_4
 - Total of 96,331 lbs of CCl_4 removed in 1994
- Current Status of Vapor Extraction Operations
 - Weekly summary for the week 01/5/95 through 01/11/95
- Condensate Transferred to ZP-1 Pump and Treat
 - Over 92 drums (3,550 gallons) of water transferred on 12/28/94

**January 19, 1995 Unit Managers Meeting
Project Status of the 200-ZP-2 Operable Unit**

ERA STATUS (Cont.)

- ZP-2 IRM Proposed Plan Delayed
 - Continue operation as an ERA
- Planning Started to Jet Perforate 22 Existing Wells

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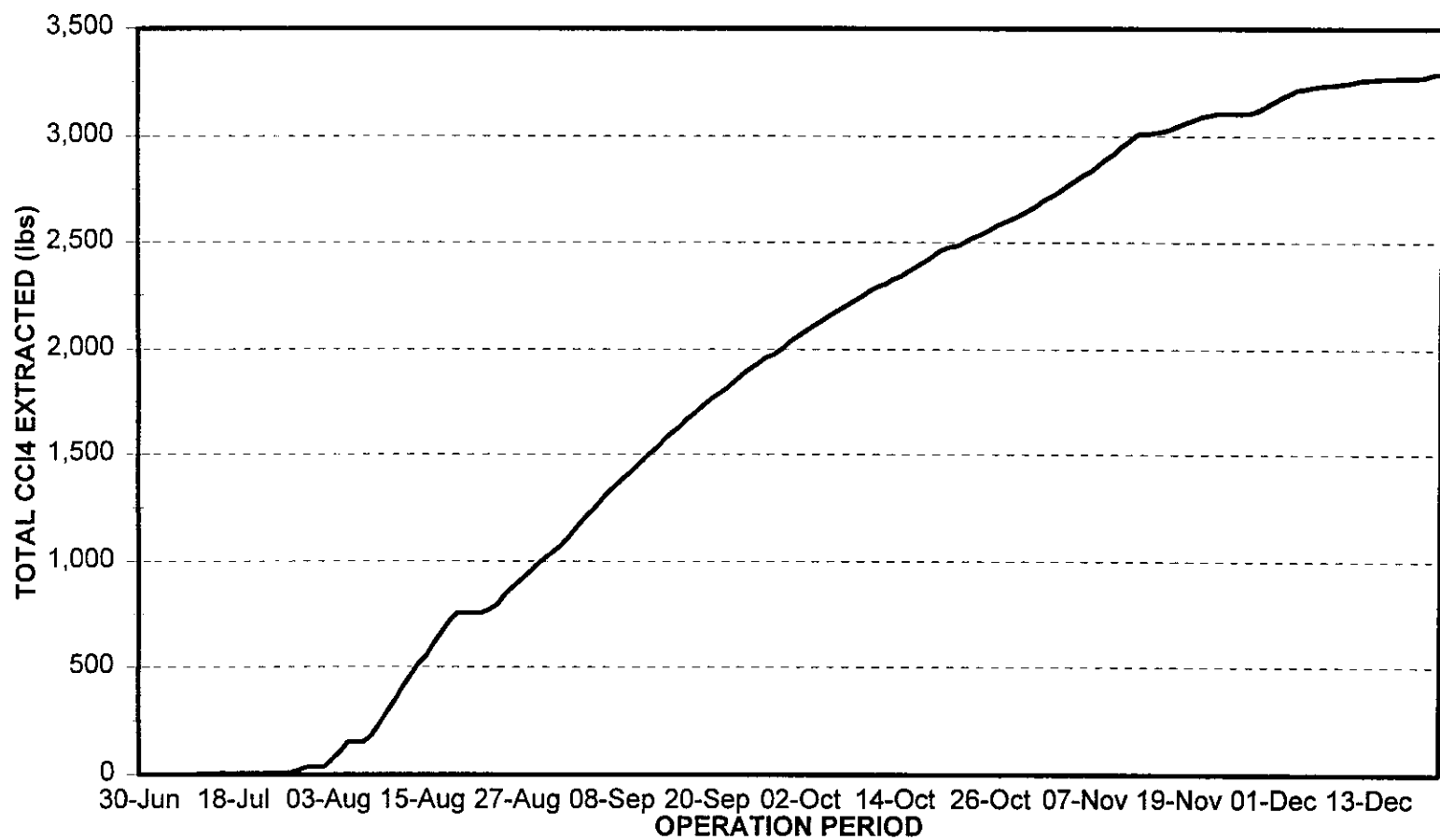
Technology Demonstrations Status

- Tunable Hybrid Plasma Vapor Treatment System
 - Waste Control Plan issued 12/22/94
 - NPL Agreement issued 12/22/94
 - Demonstration started 01/11/95

- Purus Padre Vapor Treatment System
 - Continuing work on test plan and installation design

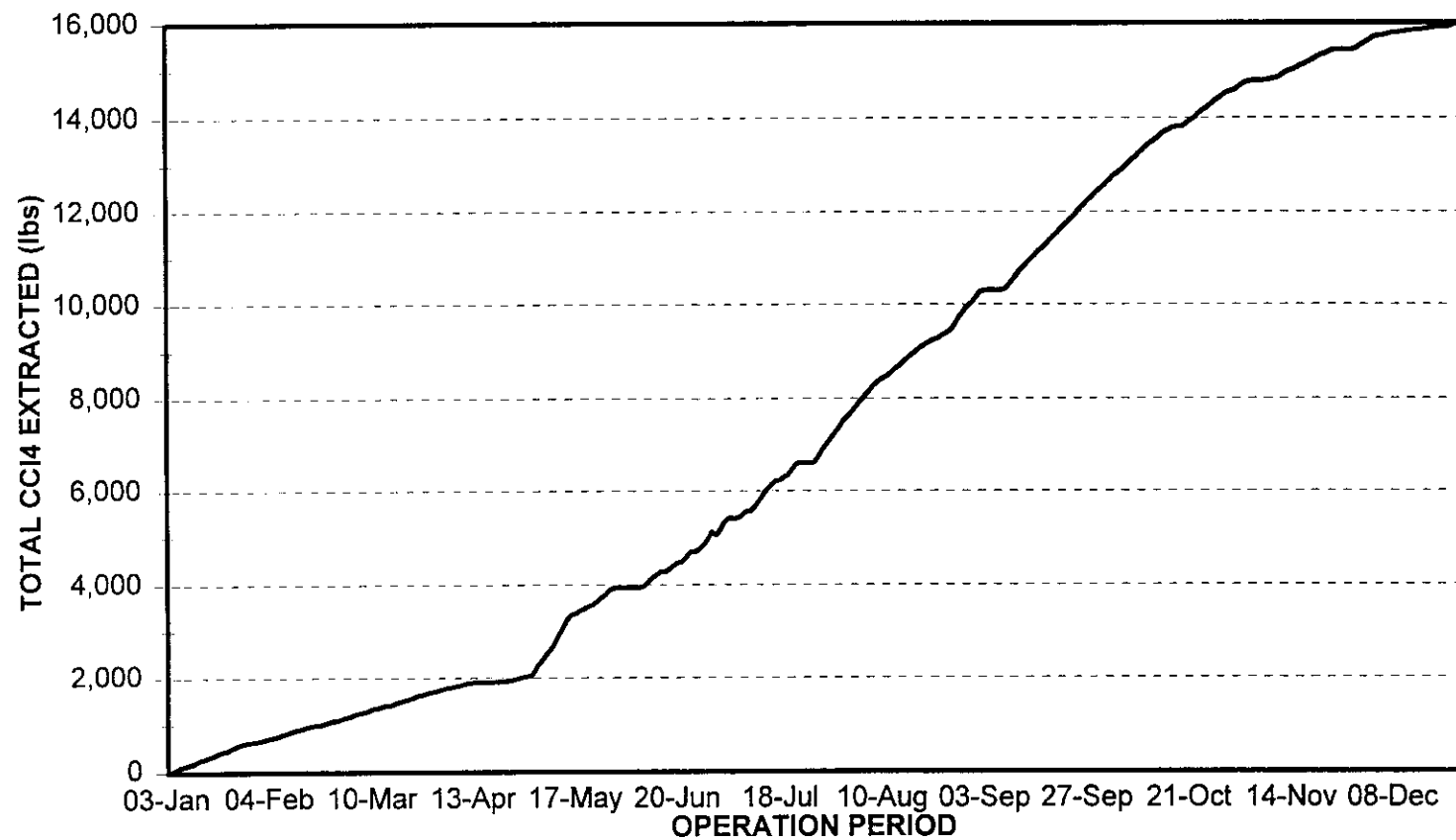
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500 CFM VAPOR EXTRACTION SYSTEM 1994 - TOTAL CCl₄ EXTRACTED



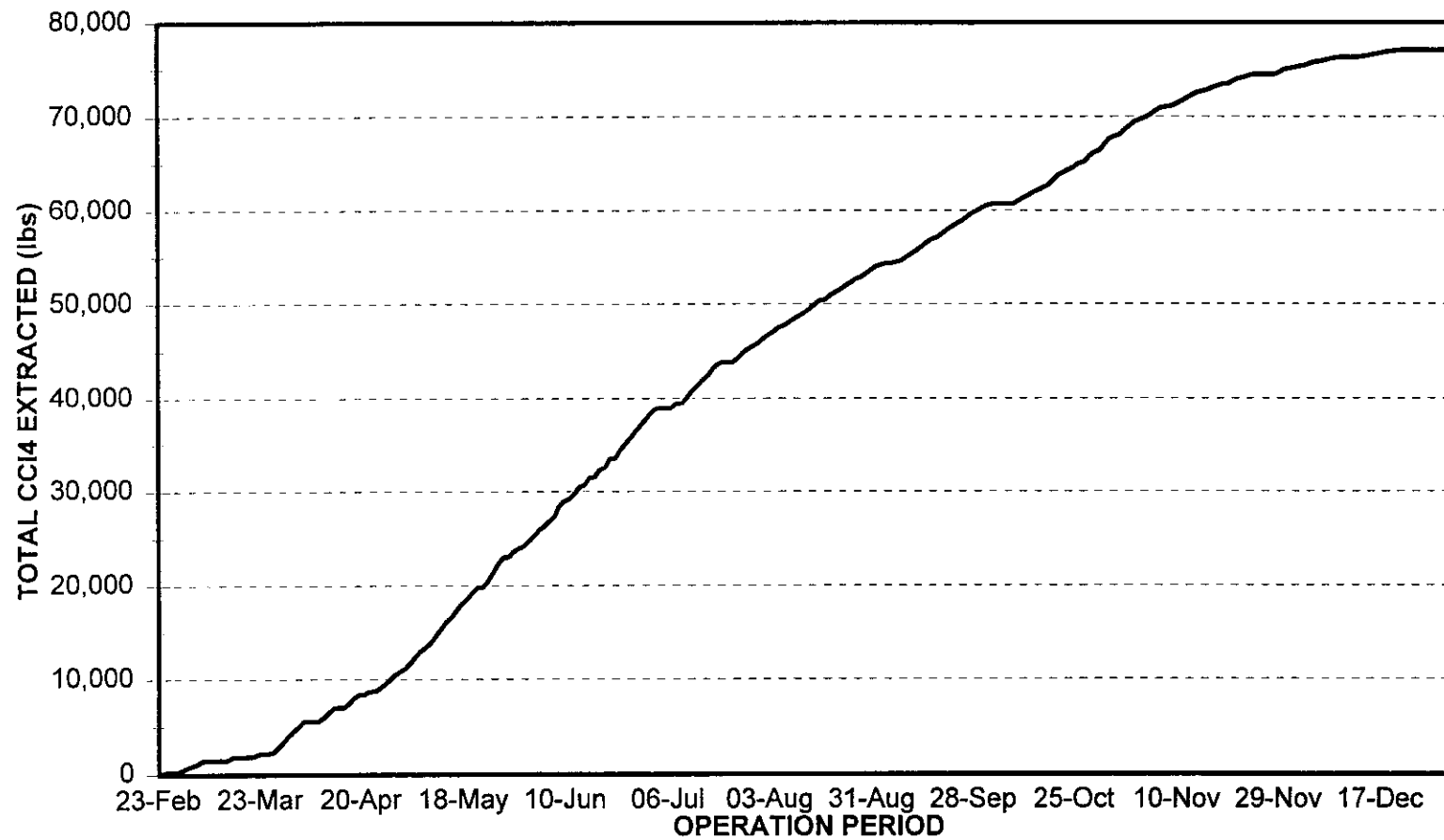
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1000 CFM VAPOR EXTRACTION SYSTEM 1994 - TOTAL CCl₄ EXTRACTED



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1500 CFM VAPOR EXTRACTION SYSTEM 1994 - TOTAL CCl4 EXTRACTED



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200-ZP-2 ERA WEEKLY CCl ₄ EXTRACTION SUMMARY						
Operational Period	VES System (scfm)	Avg. Flow (scfm)	Avg. Conc. (ppm)	Time (hrs)	System Availability (percent)	CCl ₄ Extracted kg/(lbs)
1995 01/05 - 01/11	500 (Z-18 Site)	149	39	55	33%	5 (12)
	1000 (Z-1A Site)	73	148	162	96%	18 (40)
	1500 (Z-9 Site)	420	551	145	86%	443 (974)
WEEKLY TOTAL						466 (1026)

- As of Wednesday, January 11, 1995, a total of 48.913 kg (107,612 lbs) of carbon tetrachloride have been removed by the Expedited Response Action. This value includes totals from calendar year 1992, 1993, and 1994.

Control Number: BHI-00267	200 NPL Agreement/Change Control Form __ Change __X Agreement __ Information Operable Unit(s): 200-ZP-1, 200-ZP-2	Date Submitted: November 29, 1994 Date Approved:
Document Number/Title: Pilot Scale Treatability Test Plan for the 200-ZP-1 Operable Unit, DOE/RL-94-12, Rev. 0		Date Document Last Issued: July, 1994
Originator: J. R. Freeman-Pollard		Phone: 376-1882
Summary Discussion: 1) Large volumes of soil moisture condensate are currently being generated as a result of wintertime operation of the soil vapor extraction systems associated with the 200 West Area Carbon Tetrachloride Expedited Response Action (ERA). The ERA is currently being conducted to remove carbon tetrachloride from the vadose zone within the 200-ZP-1 and 200-ZP-2 Operable Units. Presently, nearly 50 drums of condensate are being stored onsite, and a weekly generation of 8 to 10 drums is expected from the soil vapor extraction process as currently configured. There is a concern about accumulating and managing this quantity of liquid onsite. Also of concern is the limited storage space for holding the liquid. Consequently, alternative methods for managing the condensate were evaluated. One of the alternatives considered was processing the condensate at the 200-ZP-1 Pilot Scale Pump and Treat. (Continued on next page)		
Justification and Impact of Change: (See next page)		
Per J. G. Zoghbi <i>[Signature]</i> 200 Areas Project Manager		Date 12/16/94
D. M. Wanek <i>[Signature]</i> DOE Project Manager		Date 12/16/94
D. N. Goswami <i>[Signature]</i> Ecology Unit Manager		Date 12/16/94
D. A. Faulk <i>[Signature]</i> Env. Protection Agency Unit Manager		Date 12-19-94
Per Action Plan for Implementation of the Hanford Consent Order and Compliance Agreement Section 9.3.		

Total pages 3

BHI-DIS CE 12-21-94

Summary Discussion (continued)

2) This issue was presented at the Unit Managers Meeting on November 17, 1994 and the possibility of using the pump and treat system to process the soil vapor extraction system condensate seemed generally acceptable to those present. This 200 NPL Agreement/Change Control Form serves to formally incorporate this activity into the scope of the 200-ZP-1 Treatability Test and future pump and treat operations associated with the 200-ZP-1 Operable Unit.

Justification and Impact of Change (continued)

1) The 200-ZP-1 pump and treat system is currently being operated as a treatability test designed to "assess the performance of aboveground treatment systems with respect to the ability to remove the primary contaminants present in groundwater drawn from the contaminant plume." The 200-ZP-2 soil vapor extraction condensate is water moisture drawn from the vadose zone that is contaminated by the same source as the groundwater being processed by the pump and treat system. The 200-ZP-1 and 200-ZP-2 are adjacent Operable Units whose activities are being done pursuant to CERCLA authority and address the same primary contaminants (carbon tetrachloride) from the same source zone. On this basis, treatment of the soil vapor extraction condensate via the 200-ZP-1 pump and treat system is consistent with the intent of the treatability test and the EPA's policy regarding on-site activities at noncontiguous CERCLA facilities.

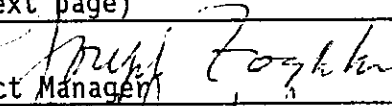
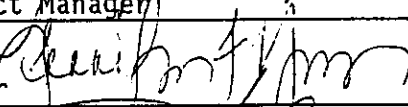
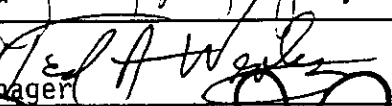

2) A VOA analysis of the condensate performed June 30, 1994 indicates that it is primarily water contaminated with chloroform at a concentration of 140 ppb. Also detected in the condensate were carbon tetrachloride (10 ppb), methylene chloride (4 ppb), acetone (34 ppb), and bis(2-Ethylhexyl)Phthalate (72 ppb). Because bis(2-Ethylhexyl)Phthalate is known to be common laboratory contaminant, its presence is suspected to be a result of laboratory contamination. Acetone has been previously reported in 200 West soils and is known to have been used in processes associated with the Z Cribs. Acetone is a volatile organic compound that is compatible with the carbon treatment used at the pump and treat system. Chloroform and carbon tetrachloride exceed the MCLs and the concentration of these contaminants are comparable to current contamination levels found in the groundwater. Additionally, the condensate has been analyzed for radioactivity since it accumulates in a portion of the vapor extraction systems prior to HEPA filtration and is considered potentially at risk for contamination. Seven composite samples were taken of the condensate on November 10, 1994 and they were analyzed for gross alpha and gross beta radioactivity. The results of the analysis indicate no detectable alpha or beta contamination.

3) Initially approximately 3,000 gallons of the condensate would be processed by the pump and treat system in a single batch run. Condensate accumulation at the vapor extraction sites is expected to occur during the winter months from the beginning of November until the first of April, for as long as the systems are operated. During this period approximately 500 gallons a week will need to be processed at the pump and treat system. Currently the pump

Justification and Impact of Change (continued)

and treat system at ZP-1 operates with an influent tank capacity of 20,000 gallons. The condensate would be added on a weekly basis to the influent tank, mixing with the groundwater being held in the tank, just prior to a daily processing run. The relatively small amount of condensate being added does not present an impact to the operational capacity of the pump and treat system. Following treatment by the pump and treat system, any organic contaminants contained in the condensate that are not present in the ZP-1 extracted groundwater will be treated so that the effluent will contain contaminant concentrations at non-detectable or below MCL levels before the condensate is injected into the aquifer. On this basis, processing of the condensate and its return to the aquifer presents no additional impacts to groundwater quality.

4) Treating the condensate at the pump and treat system will require only a couple of hours a week from the normal operating routine at 200-ZP-1. A beneficial impact of processing the condensate at the pump and treat is that it will eliminate the necessity of tracking and storing drums onsite. The cost savings gained by no longer having to track the drums of condensate will be much greater than the increased labor costs incurred during transfer of the water between the Operable Units. Transferring and processing the condensate will become part of the normal routines at both the 200-ZP-1 and 200-ZP-2 Operable Units and will be incorporated into their respective operating procedures.

Control Number: BHI-00160	200 NPL Agreement/Change Control Form ___ Change ___ X Agreement ___ Information Operable Unit(s): 200-ZP-2	Date Submitted: December 21, 1994 Date Approved:
Document Number/Title: Treatability Study of the Tunable Hybrid Plasma Reactor, BHI-00029, Rev.01		Date Document Last Issued: December, 1994 Rev.00 - August, 1994
Originator: S.A. Driggers		Phone: 372-3493
<p>Summary Discussion:</p> <p>The test plan was previously released in August, 1994, but has been revised to Rev.01 to reflect changes in operation. The major changes include:</p> <ul style="list-style-type: none"> • Sodium bicarbonate will be used in the scrubber rather than sodium hydroxide. • The offgas from the Tunable Hybrid Plasma will return to the vapor extraction stream after the GAC canisters rather than prior to the GAC canisters. <p>Treatment of the vapor stream by the Tunable Hybrid Plasma Reactor will not occur until this NPL Agreement/Change Control Form has been approved.</p> <p>Refer to Attachment 1 for a summary of the field demonstration.</p>		
<p>Justification and Impact of Change:</p> <p>1.) The activities described in Attachment 1 will cause minimal to no impact to the operation of the current 1000 CFM vapor extraction unit. A "T" will be installed in the vapor extraction unit prior to the GAC canisters to provide a small inlet stream for the Tunable Hybrid Plasma Reactor. Another "T" will be installed in the vapor extraction unit after the GAC canisters, prior to the stack, for the outlet stream from the Tunable Hybrid Plasma Reactor. The Tunable Hybrid Plasma Reactor will achieve an outlet concentration of 1 ppm CCl_4 or less. (Continued on next page)</p>		
J. G. Zoghbi 200 Areas Project Manager		Date 12/20/94
J. F. Young DOE Unit Manager		Date 12/21/94
T. A. Wooley Ecology Unit Manager		Date 12/21/94
D. A. Faulk Env. Protection Agency Unit Manager		Date 12-22-94
Per Action Plan for Implementation of the Hanford Consent Order and Compliance Agreement Section 9.3.		

Total pages 5

Justification and Impact of Change (cont'd)

2.) The existing vapor extraction unit provides a platform for testing the Tunable Hybrid Plasma Reactor for carbon tetrachloride destruction. This provides a cost savings versus having to establish an independent operations site.

3.) No schedule or budget impacts to the operation of the 1000 CFM vapor extraction unit will be incurred as a result of the testing of the Tunable Hybrid Plasma Reactor.

Attachment 1

Tunable Hybrid Plasma Integrated Demonstration
associated with the VOC-Arid ID and the CCl_4 ERA

1.0 Introduction

A field demonstration is planned as part of the Volatile Organic Compounds-Arid Integrated Demonstration (VOC-Arid ID), one of several U.S. Department of Energy, Office of Technology Development, integrated demonstrations designed to support the testing of emerging environmental management and restoration technologies. The field demonstration will be conducted at the 200-ZP-2 Operable Unit which is located in the 200 West Area at the Hanford Site, Richland, WA. The 200-ZP-2 Operable Unit is a CERCLA Operable Unit. The test is planned to begin on approximately January 3, 1994. A Tunable Hybrid Plasma Reactor (THPR) will be tested.

The purpose of demonstrating the THPR is to show that carbon tetrachloride (CCl_4) can be destroyed, particularly when in dilute quantities in a waste air stream. The tests will be divided into two phases. The scope of the first phase will be to obtain preliminary data to refine the system requirements for the monitoring instruments, dryer, and scrubber. This data will be used to refine the requirements for all of the components and the control system. The second phase scope will include the demonstration of a larger capacity electron beam (e-beam) reactor of high availability, automated operation, and component lifetime. The second may take place at another DOE site.

The following information is provided to demonstrate the substantive requirements for air quality under the CAA. Substantive requirements are demonstration of technology based standards (i.e., Best Available Control Technology).

2.0 Technology Description

The THPR employs a steady e-beam that produces a low-temperature (100°C - 200°C) plasma in the waste air stream and decomposes CCl_4 . The mechanism being considered for the plasma-induced decomposition of CCl_4 is dissociative electron attachment. The electrons produced by the e-beam selectively interact with the CCl_4 by this mechanism. Low electron energies are sufficient for this process because the dissociative attachment reaction rate constant is very large at these temperatures ($\sim 1160^\circ\text{K}$). However, the gas temperature is a function only of residence time and the power deposited into the gas by the e-beam (1200-1500 Watts). The temperature rise of the gas ranges from approximately 10°C to 120°C .

The e-beam plasma reactor consists of three major components (Figure 1) in a 45-ft trailer. First, an inlet air dryer uses zeolite to remove water vapor while passing air and solvent (CCl_4) vapor. There is also an air heater to furnish a counter flow of dry air through the columns containing the zeolite to remove the accumulated water. Second, the main component is the e-beam and flow channel. The e-beam ionizes the waste air stream, and the electrons in the e-beam plasma attach to the CCl_4 molecules, causing them to dissociate. A compressor (chiller) is used to furnish cool water for removing the waste heat from the e-beam reactor.

The third component is the gas scrubber/stripper, which removes the chlorine compounds consisting of Cl_2 and HCl from the gas stream using an aqueous sodium bicarbonate solution. The chlorinated compounds created by the e-beam decomposition of CCl_4 will dissolve in the scrubber water and create salts and carbon dioxide. The gas stream is passed through the scrubber/stripper, and the resulting air stream in the outlet is moist air without chlorine compounds.

The technology currently used to remediate CCl_4 is a vacuum extraction unit which draws CCl_4 out of the 200-ZP-2 Operable Unit 216-Z-1A Waste Disposal Crib and treats the emissions from the vacuum extraction with Granulated Activated Carbon (GAC) canisters. The test project proposes to treat a small side air stream which is taken from the primary air stream before treatment by the GAC system and returned to the air stream which flows to the extraction unit stack.

3.0 Source and Emissions of CCl_4

Currently, CCl_4 is recovered from the 216-Z-1A Waste Disposal Crib at approximately 200 PPM. A Vacuum Extraction Unit (VEU) produces a total flow of 1000 CFM. The CCl_4 is eliminated from the air stream using GAC. Current concentrations after the GAC canisters are nondetectible for CCl_4 .

When installed, the air stream flow will be a maximum of 20 cubic foot per minute (CFM) to the THPR. The treatment by the THPR will yield a proposed emission of ~~1 to 10 PPM~~ CCl_4 . The preliminary data generated from the test will be used to tune the THPR so that emissions will be minimized. Emission estimates are shown in the following table. Emissions from the THPR will be vented through the current stack used to vent the GAC canisters. The test duration will be approximately two weeks.

CCl_4 EMISSION CONCENTRATION IN PPM	CCl_4 EMISSION CONCENTRATION IN mg/M3	CCl_4 ACTUAL EMISSIONS IN LBS/YR (14 DAY TEST)	CCl_4 POTENTIAL EMISSIONS IN LBS/YR ¹
10	63	1.6	41.9
1	6.3	0.16	4.19

¹ Potential to emit is calculated at concentration for one full year (24 hours and 365 days) of operation.

4.0 Monitoring

The inlet of the e-beam reactor will be continuously monitored using a Fourier Transform Infrared (FTIR) spectrometer. The FTIR will measure the CCl_4 concentrations and information generated will be used to set the off-gas flow volume and the e-beam power. The gas streams in the THPR system will be sampled at the locations shown in Figure 2. The sampling frequency will be approximately 5 minutes. The FTIR will measure CCl_4 to 1 PPM accuracy. The following monitoring points will be monitored for CCl_4 concentrations:

- 1) The input off-gas air stream to document initial concentrations (Monitoring Point 1).
- 2) The air stream after the zeolite dryer to document any change in concentrations (Monitoring Point 2).
- 3) The outlet after the e-beam chamber and scrubber/stripper to document final concentrations (Monitoring Point 3).

In addition water vapor will be monitored at Monitoring Point 2. The e-beam chamber is three times as efficient with dry air (i.e., less than 200 PPM water vapor).

The level of salinity in the scrubber/stripper water will be determined by mass balance using CCl_4 monitoring data, and the information will be used to determine when the scrubber/stripper solution needs to be replaced with fresh sodium bicarbonate solution. The salinity will be controlled to below a level where deposits of salt form on the scrubber/stripper trays.

The FTIR will be calibrated using standard bottles of gas mixtures furnished by suppliers whose calibration methods are traceable to National Institute of Standard Technology standards. Sample mixtures in small bottle containers for non-reactive gases such as CCl_4 will be included in the trailer to check calibrations.

5.0 Conclusions

The overall purpose of this test will be to determine the performance of the technology in removing CCl_4 from a waste air stream provided at the Hanford Site. The first- and second-phase demonstration objectives are listed below.

The first-phase objectives are to demonstrate the system in a field environment, the system flexibility, and automated control. The second-phase objectives are to demonstrate efficient use of the e-beam in an upgraded reaction chamber with larger capacity. Removal efficiency in the second phase will be compared with predicted values.

The impact to air quality from this test will be minimal. This is a short term test and will not create significant emissions. The maximum potential to emit is 1.7 lbs/yr CCl_4 assuming an effluent air stream of 10 PPM and a flow rate of 20 CFM. The duration of this test is planned to be two weeks.

WASTE CONTROL PLAN

Page 1 of 6

Work Scope Description "Tunable Hybrid Plasma Integrated Demonstration", associated with the
VOC-Arid ID and the CCL₄ ERA.

List Constituents of Concern Volatile organic compounds, chlorinated compounds (i.e., CCL₄)

Site Description 200-ZP-2 Operable Unit, 200 West Area, Hanford Site, Richland, WA

Reference BHI-00029 Rev 01 Date Approved December 1994

Preparer/ S.A. Driggers

Date

Safety Class

Impact Level

Project/RI Coordinator

Print/Sign Name

NA

QS

Field Team Leader/ J. Gale

IDW Coordinator G. G. Hopkins

Cognizant Engineer K. Dunks

Planned Drilling Start and Finish Dates: From 11/94

To: 2/95

Waste Storage Facility ID Number(s) N/A

Field Screening Methods

Method	Frequency	Reference	Detection Range	Analyst
<u>pH</u>	<u>periodic</u>	<u>Tunable Hybrid Plasma</u>	<u>1-14</u>	<u>Field Team Leader</u>
		<u>Operator's Manual</u>		
<u>Chlorinated Compounds</u>	<u>continuous</u>	<u>"</u>	<u>1-1000ppm</u>	<u>Field Team Leader</u>

Laboratory Methods (constituents of concern)

Method	Frequency	Reference	Detection Limits	Contract Lab
<u>Radionuclides</u>	<u>Prior to disposal</u>	<u>LA-S48-111</u>	<u>TBD</u>	<u>222-S</u>
<u>(Total Activity)</u>		<u>LA-S08-121</u>		
<u>Halogenated Compounds</u>	<u>"</u>	<u>SW-846(8010)</u>	<u>TBD</u>	<u>TBD</u>
<u>Volatile Organic Compounds</u>	<u>"</u>	<u>SW-846(8240)</u>	<u>TBD</u>	<u>TBD</u>

APPROVALS (Print/Sign Name and Date)

G.G. Hopkins

IDW Coordinator

S. A. Driggers

Project/RI Coordinator

N/A

Safety Function (if required)

K. L. Dunks

Field Team Leader/Cognizant Engineer

N/A

Quality Assurance (if required)

WASTE CONTROL PLAN

Page 2 of 6

Drill Site Coordinate Location Z-1A Vapor Extraction System (N38750, W76680)

Waste Container Storage Area(s) Coordinate Location(s) 200-ZP-2 Centralized Waste container Storage Area
(N38750, W76680)

Requirements for Soil Pile Sampling (if any) _____

Nonregulated Material Disposal Location(s) Hanford Site Central Landfill

SKETCH OF WORK SITE

See Figures 1 and 2.

APPROVALS (Print/Sign Name and Date)

D. Faulk

Lead Regulatory Agency Representative

J. F. Young

DOE-RL

J. G. Zoghbi

Project Manager

ATTACHMENT 1

TUNABLE HYBRID PLASMA INTEGRATED DEMONSTRATION
WASTE CONTROL PLAN

WASTE MANAGEMENT:

This plan addresses the wastes generated as a result of the Tunable Hybrid Plasma Reactor (THPR) Integrated Demonstration. This activity is associated with the Volatile Organic Compounds-Arid Integrated Demonstrations (VOC-Arid ID). The THPR process is receiving its vapor feed stream from the 200-Z-1A Tile Field Vapor Extraction System associated with the 200 West Area Carbon Tetrachloride Expedited Response Action (ERA).

Waste generated as a result of this activity will be managed per *Environmental Investigations Instruction* (EII) 4.3, "Control of CERCLA and Other Past Practice Investigation Derived Wastes", and will adhere to the packaging directives detailed in WHC-EP-0063, "Hanford Site Solid Waste Acceptance Criteria". Waste generated by this activity will include:

- Spent NaHCO_3 scrubber solution that should be transformed to a salt (NaCl and potentially hypochlorite, OCl^-) brine solution during processing. Added to the stripper solution will be any water collected from the dryer.
- Miscellaneous trash (non-regulated), including any decontaminated PPE, equipment, etc., used during sampling, waste handling, or decontamination.
- Solid F-Listed waste, such as wipe rags that may be used in waste handling.

Encounter with radiological components is not expected during this demonstration. However waste will be radiologically released prior to final disposal. The vapors being used as feed stock for this demonstration have been identified as "listed" waste due to the presence of carbon tetrachloride. Therefore, the spent scrubber solution and the zeolite dryer material (if it will not be reused) will be at a minimum designated as "listed" hazardous waste. However, it should be noted that laboratory analyses of the brine solution have shown less than 1 ppm CCl_4 . Waste generated as a result of this demonstration will be scheduled for near future disposal at the appropriate facility as opposed to extended storage at the operable unit-specific Centralized Waste Container Storage Area until a final Record of Decision (ROD) is issued.

It is estimated that one to two 55-gallon drums of the salt brine will be produced. The aqueous F-Listed waste will be disposed of using current technologies, e.g., incineration. WHC maintains contracts with offsite vendors who handle the disposal of these wastes.

Miscellaneous trash will be handled with the miscellaneous trash generated from the 200-ZP-2 vapor extraction systems.

Solid F-listed waste will be transferred to accumulation barrels which are maintained in the 200-ZP-2 Central Waste Container Storage Area for the vapor extraction systems.

DECONTAMINATION:

After the field demonstration, the THPR system will be returned to MIT to upgrade the system prior to the second-phase demonstration. MIT is the owner of the THPR and is responsible for performing the decontamination of the system to meet MIT requirements for transport of the unit back to MIT and for further use of the unit as part of the second-phase field demonstration. After decontamination, MIT personnel will certify that the THPR system is decontaminated and will assume full responsibility for the equipment.

The salt brine will be removed from the scrubber and sampled for waste designation purposes. MIT will certify the THPR system is decontaminated and assumes full responsibility for the equipment.

RESPONSIBILITIES:

The following defines responsibilities for waste management and decontamination.

ERC Personnel:

- Package the brine solution according to EII 4.3.
- Collect samples of the brine solution and ship to MIT contract laboratory.
- Store drums at the operable unit Central Waste Container Storage Area prior to shipment to 616 Building.
- Arrange for designation after sample analyses are received.
- Arrange for drums to be shipped to 616 Building for storage.

MIT Personnel:

- Assist in packaging and sample collection.
- Arrange sample analysis with their contract laboratory and provide the analysis funding.
- Perform decontamination of system.
- Certify system is decontaminated.
- Assume full responsibility for the equipment and will transport the equipment back to MIT.

WHC/KEH Personnel:

- Designate the waste based upon laboratory analyses.
- Ship drums to 616 Building.
- Store drums until final disposal.
- Arrange for final disposal.

218-W-11

218-W-1

218-W-2

218-W-4B

216-T-21, 22, 23 & 24

241-TY TANK FARM

241-TX TANK FARM

216-T-25

216-Z-16

231-Z

216-Z-19

216-Z-7

216-T-31

216-T-20

284-W Powerhouse Pond

216-Z-1 DITCH

216-U-14 DITCH

216-Z-8

216-Z-9

216-Z-21 Seepage Basin

216-Z-20

216-Z-11 DITCH

241-U TANK FARM

216-Z-12

216-Z-1A

216-Z-18

218-W-4C

234-5Z

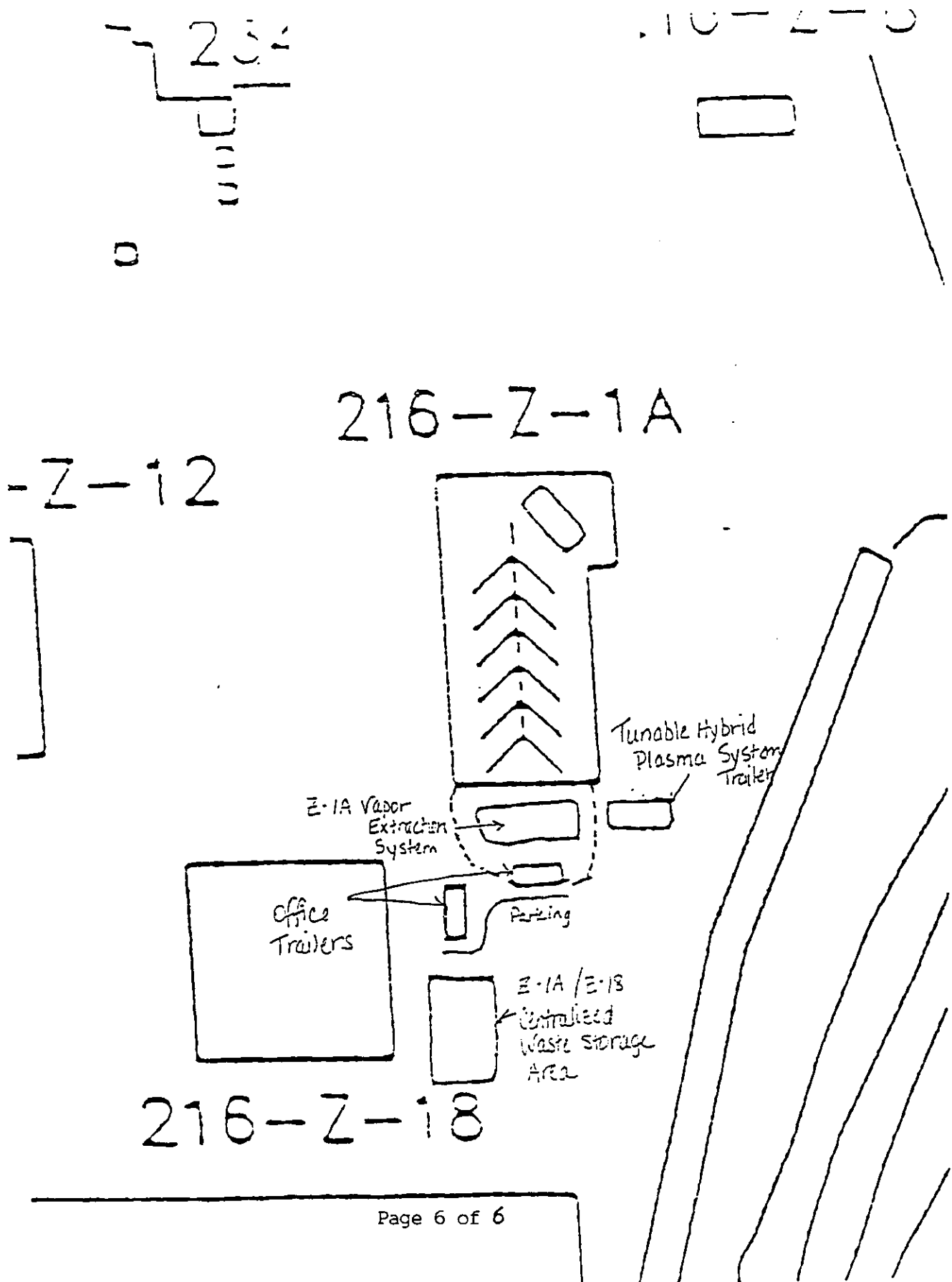
DAYTON AVE

0 500 Feet

Legend:

- 216-T-23
- 216-T-27
- 215-T-26

Figure 2. . Blow-up of 216-Z-1A Trench Site.



Unit Manager's Meeting: 200-ZP-1 Operable Unit
January 19, 1995

1. NEW ACTION ITEMS (INITIATED November 17, 1994):

2ZP1.1 Opened 11/17/94.

2. PILOT SCALE TREATABILITY TEST

- Status - Extracted 490,880 gallons
 Treated 476,090 gallons
 Injected 475,299 gallons

3. TECHNOLOGY DEMONSTRATION - BIOREMEDIATION

- Status - Chris Kramer and Kim Koegler

4. FORECASTED AND OTHER ACTIVITIES

- Treatability Test Report

Preparation of the treatability test report has begun.

- IRM Implementation

Preliminary drilling activities have commenced. Awaiting EPA and Ecology comments on the description of work (DOW) (BHI-00155) and the DNAPL report (BHI-00152).

- Technology Demonstrations - In-Well Vapor Stripping and Iron Filings

In well vapor stripping - One well completed to 235ft. However technology demonstration will now be conducted at Edwards AFB.

Iron filings - Schedule to begin June 1, 1995.

Action Item Status List

Unit Manager's Meeting: 200-ZP-1 Operable Unit
January 19, 1995

ITEM NO.	ACTION	STATUS
2ZP1.1	Provide to EPA (Paul Beaver) data on the Iron Filing Pilot Scale treatability test performed by Waterloo. Action: Donna Wanek.	Opened 11/17/94.

Distribution

**Unit Manager's Meeting: 200 Aggregate Area/200 Area Operable Units
January 19, 1995**

Donna Wanek	DOE-RL, PRD (H4-83)
Jennifer Young	DOE-RL, PRD (H4-83)
Mary Harmon	DOE-HQ (EM-442)
Richard Person	DOE-HQ (EM-442)
Paul Beaver	200 Aggregate Area Manager, EPA (B5-01)
Dennis Faulk	EPA (B5-01)
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